Status

This Amendment is responsive to the Office Action dated December 6, 2007, in which claims 1, 3-9 and 11-16 were rejected. Claim 1 has been amended; and new claim 17 has been added. Accordingly, Claims 1, 3-9 and 11-17 are pending in the application, and are presented for reconsideration and allowance.

Claim Rejection - 35 USC 102

On page 3 of the Office Action, the Examiner rejected claims 1. 3, 5-9, 11 and 13-16 under 35 U.S.C. § 102 as anticipated by Wyman.

Wyman is directed to a system that takes two "separate" sets of images, such as a set of MRI images and a set of CT image as noted by the Examiner, and aligns the images to align common subject matter in the images. Because each set of images is taken in a same session, all the images in each set are aligned. As a result, Wyman essentially is about aligning two images, one from each set, because once an image from one set is aligned with an image of the other set, all of the images from the two sets can be aligned using the same angle of rotation. The Examiner notes that the sets may be taken at separate times.

In contrast, the invention of claim 1 calls for the images to be "a sequence of in vivo images in a same set". The invention of claim 1 takes two images from this same sequence set and determines "a rotation angle" between a "reference image ... from the sequence" and a "second arbitrary ...from the sequence". The rotation angle is used for "correcting the orientation of the second arbitrary in vivo image, with respect to orientation of the reference image and corresponding to the rotation angle." Wyman does not teach or suggest such. Withdrawal of the rejection for this reason is requested.

Further, claim 1 also calls for determining "an accumulated rotation angle between other selected in vivo images and the reference image" and "correcting for the other selected in vivo images that do not match the reference image's orientation using the accumulated rotation angle". As noted above, Wyman is aligning two sets of images where the images within each set have the

same alignment. It is submitted that Wyman does not address much less teach or suggest accumulating a rotation angle and using it to correct other images in the sequence.

With respect to claim 3, the Examiner asserts that an accumulated correction angle is taught by Wyman and points to figure 5, col. 8, line 60 - col. 9, line 6 and col. 10, line 48 - col. 11, line 3. The text at starting in col. 8 referenced by the Examiner is about Figure 4 and states:

> FIG. 4 is an example flow diagram of the steps performed by an example Enhanced Image Registration method 405 when registering one image set to another. In step 410, the EIRS receives as input two image sets. One skilled in the art will recognize that each image set may comprise one or more images, each image having one or more dimensions and that the registration may be performed with respect to one or more dimensions, acquisition orientation, or time differences. In addition, one skilled in the art will recognize that the described process may be extended to bring an arbitrary number of images or image sets into alignment. In step 420, the Image Comparison Module of the EIRS compares the image sets to determine whether or not they are aligned. (Wyman, col. 8, line 60 - col. 9, line 6)

This text says nothing about accumulating a rotation angle nor anything about an accumulated correction angle.

The text staring in col. 10, states:

> FIG. 5 is an example diagram of sample locations within an image set selected for determining the magnitude of transformation. In FIG. 5, individual images 502 are stacked to form an image set, which is centered on a three-dimensional coordinate system. The image set is shown, for illustrative purposes, centered on a coordinate system comprising a x-axis 503, a y-axis 504 and a z-axis 505. The eight corner points 501 are those selected in an example implementation of an EIRS as points within the image set that are most sensitive to affine transformations. This is illustrated by considering a transformation that results in a rotation of the image set about the y-axis 504. The positions of the points along the y-axis do not change, while the points within the image set that are furthest from the y-axis change location the most. The selected eight corner points 501 represent the mathematical location of the set of points furthest from the x-axis, the set of points furthest from the y-axis and the set of points furthest from the z-axis. Thus for any rotation centered around the origin, where the x-axis, y-axis and z-axis intersect, a set of the corners will have the greatest movement of any pixel within the stack. Therefore, the set of eight corner points 501 is the set of points within the example image set most sensitive to affine transformations. (Wyman, col. 10, line 48 - col. 11, line 3)

This text also says nothing about accumulating a rotation angle.

It is submitted that Wyman does not address much less teach or suggest accumulating a rotation angle and using it to correct other images in the sequence as called for in claim 1.

Withdrawal of the rejection for this additional reason is requested.

It is submitted that the present claims patentably distinguish over Wyman and withdrawal of the rejection is requested.

The dependent claims depend from the above-discussed independent claims and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. For example, claim 8 calls for "c) determining whether a feature point that resides on the axis of the first image plane moves off the axis in the second image plane; and d) measuring the feature point's movement off the axis in the second image plane to determine the rotation angle and its direction.". The Examiner points to Wyman at col. 6, lines 54-64 and col. 10, line 48 - col. 11, line 3 (see above quoted text) for these features. The text noted in col. 6 states:

> The method also a) calculates a quality of alignment between the reference image set and the evaluation image set using the selected feature set, b) calculates a location value (C) from one or more points on the evaluation image set with respect to the selected one or more fixed reference points and storing the calculation in the memory, and c) calculates a next transformation to apply to the evaluation image. In step d) the transformations are applied to at least a subset of the evaluation image set and step e) calculates a convergence value (V) for the current iteration (i) and stores the convergence value to the memory. (Wyman, col. 6, lines 54-64)

The text pointed to by the Examiner does not talk about determining whether a point is off axis and measuring the movement off axis.

It is submitted that the dependent claims are independently patentable over the prior art.

New claim 17 emphasizes the above discussed distinctions of claim 1 and also emphasizes that the images do not need to have spatial overlap "where the second arbitrary image and the reference image need not have a spatially overlapping area". In contrast, the Wyman images "contain spatially overlapping areas of an imaged subject" (see col. 6, lines 34-45 and col. 15, lines 44-49). Nothing in the prior art teaches or suggests no need for an overlap. It is submitted
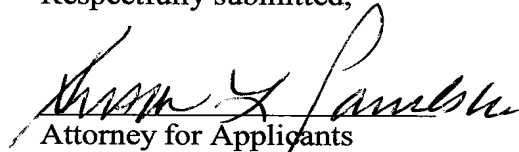
that this new claim, which is different than prior filed claims, distinguishes over the prior art.

Summary

Should the Examiner consider that additional amendments are necessary to place the application in condition for allowance, the favor is requested of a telephone call to the undersigned counsel for the purpose of discussing such amendments.

For the reasons set forth above, it is believed that the application is in condition for allowance. Accordingly, reconsideration and favorable action are respectfully solicited.

Respectfully submitted,

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